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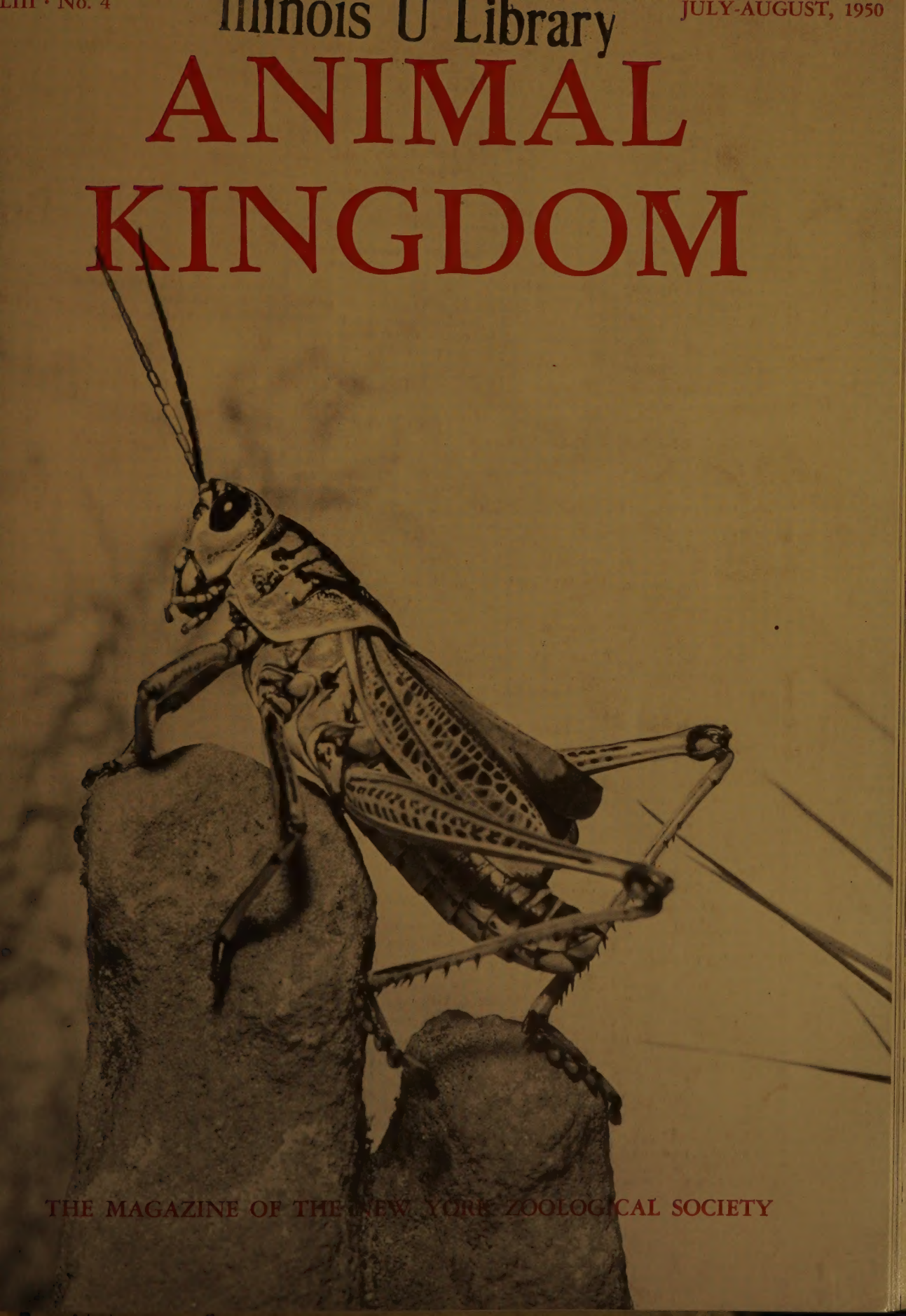
ANIMAL KINGDOM



THE MAGAZINE OF THE NEW YORK ZOOLOGICAL SOCIETY

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ANIMAL KINGDOM

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Aspects of Present-Day Conservation

Extracts from recent writings and addresses by FAIRFIELD OSBORN, *the Society's President.*

NATURE may be a thing of beauty and is indeed a symphony, but above and below and within its own immutable essences, its distance, its apparent quiet and changelessness it is an active, purposeful, coordinated machine. Each part is dependent upon another, all are related to the movement of the whole. Forests, grasslands, soils, water, animal life – without one of these the earth will die – will become dead as the moon. (*Our Plundered Planet*).

The meaning of Conservation is not simply one of method or technique. In its broadest sense it is a way of life. It involves processes that are social and ethical as well as material. It bears on the structures of economy and of law. It involves questions as to numbers of people. It calls for far wider application of techniques and knowledges, most of which are now at hand. Science and education are its allies. It demands understanding of the relationship of human beings to natural processes. Its ultimate purpose aims not only at the subsistence but at the welfare of all people. (*Address: Philadelphia Forum*).

When we analyze the business and industry of this great nation of ours and study the nature of the activities of everybody who is at work, we find that well over half of our national economy, in all its categories, is based upon the use and handling of the products of the land. The conservation and wise use of our renewable resources is the foundation of our economic prosperity. In effect, Conservation is everybody's business. (*Address: Herald-Tribune Forum*).

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DEAMER THE LEMUR

Photo by Helen & Samuel Grove

DEAMER THE LEMUR joined our globe-trotting Naval Medical Research Team the first night we were camped in the hinterlands of southern Madagascar. We were delighted to adopt the scared, saucer-eyed little beast that came to us clutching the kinky black hair of a native, who only that afternoon had snared the mother lemur and thrown her into a stewpot. The orphan was hardly a mouthful, and so after supper the satisfied diner offered him to us as a getting-acquainted present. He joined the Navy and saw the world, but that evening we scarcely foresaw that soon our mascot would develop into an ultra-sophisticated member of human society.

Within a few months the little animal had become so civilized that he accepted aeroplanes and automobiles as commonplace but screamed in terror when he saw an adult of his own species in the Madagascar Zoo. He raced for safety when a moth flew by, but stole the show at a Washington press conference and reduced admirals to grinning boys as he tugged at their hair.

By HARRY HOOGSTRAAL
Field Research Associate
Chicago Natural History Museum

All Photographs by the Author
Unless Otherwise Indicated

Our first job after obtaining the mascot was to find a name for him. One of the members of our three-man team was a Medical Research Assistant, Chief Deaner K. Lawless, USN, and the alliterative attraction of Deaner and lemur quickly suggested the name of Deamer the Lemur. The Chief's surname seldom had to be applied to the lemur, for he was an unusually law-abiding animal! Deamer became the lemur's formal name, but we also used a nickname, Maki, the word employed by Madagascar natives to designate this species of lemurs. Soon he responded to either name with good natured alacrity.

The group that Deamer joined was the Research Team of the United States Navy Medical Science Group, which was associated with the University of California African Expedition. After nine months of research in Africa, Captain J. J. Sapero (MC) USN, one of the Navy's outstanding research scientists, who was in charge of the naval group, had sent us to Madagascar in the Indian Ocean off Africa to make the first survey ever attempted on the blood diseases of the wildlife of the island. Our object was to find new diseases and new laboratory animals for use at the Naval Research Institute at Bethesda, Maryland. Among other things, this was part of the still-continuing effort to learn more about the peculiarities of the malaria cycle in man and animals in the hope of discovering a perfect drug for the prevention and cure of malaria.

In Madagascar, *Lemur catta,* which is the scientific name of Deamer's species, is confined to the southwestern lowlands and to part of the adjacent great central highlands. The species is equally at home on the ground or in trees, and its habitats range from treeless, rocky areas to not-too-dense forests. Single animals are sometimes seen, but more often they travel in bands of four to a dozen or more. One often sees them near native villages; indeed they display remarkably little fear of man. Watching a band of lemurs in a tree, eating, chattering at one another, engaging in tussles, playing a game of tag with a vocal accompaniment as happy as a group of children, or just lazing about cleaning each other's luxuriant fur, often gave us a pleasant respite from the arduous day's work.

When we first got Deamer, we decided to study his food preferences. (The military away from home is always seriously concerned with food of any kind.) We were on a scientific mission, and just being good company didn't pay Deamer's way; he would have to contribute to the scientific findings in this simple manner at least. Champagne and beer came first on the list. Each day the list of implausibles grew: guinea fowl, steak, lobster, fried fish, sugar, peas and beans, bread and butter, mustard, pickles, spaghetti, in fact everything that we ate and drank except coffee, and eventually he even took a liking to coffee. So we decided that Deamer was a lemur, not a guinea pig, and wrote off our noble experiment with the words "practically omnivorous."

One of Deamer's food habits was of special interest to me. I noticed that whenever he could find a piece of charred wood he gnawed happily

Photo by Catherine Hoogstraal Walker

The lemur developed an insatiable thirst for wate which may have been a somewhat neurotic reactio to strangeness of its surroundings while travelin

at it. Carbon-eating had interested me two years earlier in the Philippines when observing the habits of the tarsier, a more specialized relative of the lemur group. Old literature and contemporary folklore claims that the tarsier subsists on charred wood and carbon. It had taken me some months of backbreaking work to find large populations of this rare animal, and among other things I wanted to find out whether there was any truth in the legend. The species had even been given its specific name, *carbonarius,* because of this story. But try as we might, we could never get our captive tarsiers to accept the carbon course that was offered to them among other delicacies. As a result I had assumed that there was little if any factual basis for the legend, but after having watched cousin Deamer I am beginning to wonder whether our tests were extensive enough or carried out under the proper conditions.

Flowers and leaves are appetizing food for *Lemur catta* in nature, and this is attested by the predilection of our pet for bouquets and house plants. In Madagascar whenever we were invited to dinner Deamer avidly attacked the bouquets, and though otherwise he usually obeyed quickly when ordered not to do something, we had considerable difficulty in calling him off. However flowers in Madagascar are plentiful and cheap and our hosts always urged him to eat his fill.

Among the natural foods of *Lemur catta,* fruits and seeds form much of the bulk. A band of lemurs follows the circuit of seasonal fruits as they ripen in the trees in its area. When we were in the Tulear district the "kili" or tamarinds were ripe and bands of "maki" could be found in the biggest trees almost any morning or late afternoon. It was most amusing to watch them sitting erect on a branch, leaning against the trunk, legs stretched full length on the branch, reaching with their hands for a nearby tamarind. They leisurely picked the fruit from its sticky cover and ate with attention divided between the fruit and the antics of the already satiated members of the band frolicking in nearby trees. Wild figs are another favorite food, and, I suppose, furnish a part of their meat fare too, for I have found wild figs usually heavily infested with insects in the

tropics the world over. Some observers report that this species also eats the eggs and nestlings of birds.

The juicy fruit of the prickly pear cactus is a delightful dry season viand for humans or lemurs. The thick cover of the fruit, bristling with thousands of tiny needles, is easily and quickly stripped off by the long canine teeth. Lemurs often raid bananas or other domestic fruit trees and only then do these otherwise innocuous animals arouse the ire of their human neighbors.

One often reads in popular and scientific literature that lemurs are nocturnal animals. This is true of most if not all of the lemurs found in other parts of the world, but of the almost forty kinds in Madagascar the majority of the larger varieties and some of the smaller ones are active principally by day. When napping during the day, Deamer sat with his head bowed between his legs and his tail around his neck, or on his side curled up in the same relative position. *Lemur catta* in nature usually naps during the heat of the day. At night the bands sleep more or less huddled together in the highest trees. On very dark nights they can see poorly if at all.

A *Lemur catta* mother carrys her young astraddle her back until the baby is well over half grown. A larger youngster may venture away a bit to investigate its surrounding but dashes back and climbs aboard when the mother calls. It is said that for the first few days after birth the baby is carried underneath the mother the way monkeys usually carry theirs. We have seen different *Lemur* species carry three-fourths grown young wrapped sideways around their middle with head, legs, arms and tail sticking out everywhich way. When thus-encumbered females jumped, it was difficult to tell just what was happening! *Lemur catta* bears one young at a time, but there are records of two at a birth. Apparently when first born the little ones are sparsely clothed with hair, but we have not seen any at this stage. What surprised me about young Deamer was his inability to bite into or tear apart fruits of the consistency of apples. The females must have to give their offspring considerable assistance with breaking into food for some time after they are weaned.

The physical structure of all lemurs is of intense interest to scientists because of the close relationship of the lemur group to man. Man, monkeys and the higher apes are suspected of having evolved from primitive lemuroid stock. Several important studies have been made on various phases of lemur anatomy, but surprisingly much of this comparative research remains to be done. The greatest gap in our knowledge is in the field of functional anatomy, the study that concerns itself not just with the size of shape of a bone, muscle, or organ but with the method in which the animal utilizes these structures. As a contribution to this important field of research, after our return Captain Sapero allowed us to turn Deamer over to the Chicago Natural History Museum. He is now living in the home of Doctor Dwight Davis, Curator of Anatomy at the Museum, where, besides becoming an established member of the family, he has become the object of close observation for the benefit of science.

Even during the first few weeks of his stay with the Davises, Deamer has been able to pro-

Photo by Catherine Hoogstraal Walker

Spiced foods of all kinds, and particularly catsup, were relished by Deamer. Eventually it appeared that there were very few foods he would not eat.

To trap lemurs, natives cut a strip across a narro neck of forest, bridge it with a log, and then set noose on the log where the lemurs naturally wa

vide the answers to several important questions. For example, anthropologists were much interested in knowing whether lemurs are able to move their eyes, and Doctor Davis has already been able to tell them yes. When Deamer picks up a raisin and examines it closely before stuffing it into his mouth, his eyes do move closer together. This simple observation will assist in the better understanding of the functions and anatomy of the lemur's eye.

Just what does our little friend look like? Well, most people regard him as a monkey with some raccoon affinities. He does look much like a happy little monkey, to which he is closely related, but he is not at all related to the raccoons, despite a similar alternately black-and-white ringed tail. We estimated that he was a couple of weeks old when he joined us, and a month later his head and body measured eight and a half inches long, his tail twelve and a half inches. At that time he weighed about fourteen ounces. Six months after the record began, he weighed twenty-eight ounces and his head and body were thirteen inches and his tail eighteen and a half inches long. His soft, thick fur is a delicate ashy-gray color tending towards darker gray along his back. His face, ears, chest and underparts are snowy white except when he has found something of interest in the coalbin. A hot, soapy bath quickly restores the original color after these escapades. As he grows older the fringe hairs on his arms and legs and the hair on his tail are becoming noticeably longer.

Among the Primates, the order of animals that includes lemurs, tarsiers, monkeys, apes and men, in which the tendency is for the lower part of the face to be shoved beneath the eyes, the true lemur's muzzle is exceptional for its narrow, fox-like elongation. Chiefly for this reason our species has been referred to in literature as the Madagascar cat, the Madagascar fox, or the ring-tailed cat.

The lemurs have big, bright eyes with a reddish iris and a black pupil reduced almost to a pinpoint in bright sunlight and enlarged greatly as the light becomes dimmer. Their arms are shorter than their legs, and the curious tail-end-up appearance these animals have when they walk or run on the ground belies their swiftness and agility in or out of trees. The long, bushy tail is held straight up or curled forward over the back when the lemur is on the ground. It is a valuable rudder or balancing organ when jumping among the trees. The tail is not prehensile;

that is, it is not used as an extra grasping organ.

Among the anatomical peculiarities of *Lemur catta* several features of the dentition are of interest. We have already noted the long canine teeth of the adults that are used for stripping off the coating of the fruit of the prickly pear cactus. The canine teeth of the males are longer than those of the females and are used for establishing superiority during the mating season. The females in turn use theirs to ward off undesired advances. Just before we left Tananarive, a magnificent male in the zoo was bitten so severely in the neck by his disinclined mate that he died within a few hours.

Except for such purposes these lemurs probably have little defensive need for their canine teeth. There are few predacious animals on Madagascar, and only one so large that it might cope with an adult "maki." This is the fossa, a large civet that probably takes some toll. It is likely that boas, of which there are several species that grow to some size, also attack lemurs, as might a few hawks and owls.

The most remarkable feature of the teeth of *Lemur catta*, shared by most other lemurs, is the row of lower incisors (front teeth), which resembles a comb with closely-set teeth. The animals spend long hours running these "scraper teeth" through their own thick fur and through that of their companions. When one grooms the other in this manner it usually responds in kind, with a low, cat-like purr of happiness.

Another useful toilet tool which this and most other lemur species possess is a grooming claw on the second toe in the place of the nails on the other toes. This claw is sometimes drawn through the coat as a dog might do, but is chiefly used to reach areas, such as behind the ears, which cannot be reached by the teeth. With all these grooming devices, lemurs manage to keep themselves immaculately clean.

Besides the nails and grooming claws, the lemur's hands and feet are remarkable for their thick, leathery pads on the soles, palms and digits. The opposable thumb and first finger in addition to the strong, elongated digits are in themselves no little asset in running, clutching or grasping a branch on the jump. But being further fortified by these thick pads, the animals can glide over slippery rocks or find firm grasp on a branch after a tremendous leap.

The pet lemur makes a variety of sounds. He

ough some colonies of Lemur catta live in rocky, less areas, most lemurs are not as much at home the ground as they are high in the forest trees.

is sublimely happy when being combed, petted or scratched, or when going to sleep, and purrs like a kitten. In Madagascar when he dashed about our mosquito nets he emitted a fairly loud, throaty chuck-chuck-chuck. In his new home in America he makes almost the same sound, as well as a loud bark when he scrambles up a curtain upon seeing a dog. If confined to a room without his friends he gives forth with a loud, shrill whine. Twice when riding on our shoulders in Madagascar he saw large hawks soaring overhead and then he gave a loud warning call which was so sudden and so peculiar that I am at a loss to describe it. Wild lemurs at play in trees call and bark to one another almost constantly.

Before we finish these observations on our pet and on wild specimens of *Lemur catta,* it is well to stress that these facts apply only to this species and not to lemurs in general. Zoological literature is full of vague generalizations and misstatements about lemurs. It is often assumed, for instance, that lemurs are nocturnal animals, whereas a fair number of the Madagascar species are not. *Lemur catta* is often used as an example of the true lemurs because it is the best known species, but actually its habits are unique among even its closet relatives.

The killing of lemurs is prohibited by an international agreement, except on permission of scientific authorities for scientific purposes. While our species of lemur is surprisingly common in many parts of its range, it probably is in need of some degree of protection. Misguided "hunters" on an afternoon jaunt out of Tulear can and do shoot at sitting lemurs more easily than at a sitting duck. Meat-hungry natives relish the flesh of all the larger species of lemurs and snare them with ease, a pastime they apparently seldom if ever engaged in before the coming of the white man. The fact that this species inhabits land of

The lemur's lower front teeth resemble a comb and these efficient scrapers are used by the animal to groom its fur—or a friend's skin!

Deamer the Lemur could always be counted on to take an interest in the expedition's activities, generally from somebody's shoulder or atop a man's head.

marginal or sub-marginal agricultural value, and that it proves itself exceptionally adaptable to changed and varied conditions, seems to assure its survival in the face of man's onslaughts.

Several strictly arboreal species of lemurs have become extinct on Madagascar in the past few hundred years because they had no place to go as the forests were cut and burned over. Until fairly recent times much of Madagascar was heavily wooded. Now forests remain only in the rugged eastern mountains and foothills. The decimation of the Madagascar forests has been one of the most thorough and widespread in the world. The pity of it is that it has been accomplished by one of the least dense populations of the world and by ignorant tribes who derived only the slightest short-term return from the land.

A few lemur species have benefitted from the loss of Madagascar's original forest. These are chiefly the dwarf and mouse lemurs, which thrive and multiply in the second growth scrub and forest that takes over the land after the original forest has been destroyed and the land abandoned. Then these small lemurs often become "as common as rats."

Zoologists know Madagascar as the home of lemurs. About forty kinds live there today, fully half the number known from the whole world. The other half of the lemur group is thinly distributed through western and eastern Africa, southern India, the East Indies, Ceylon, Borneo and parts of southern Philippines. More than half of the Madagascar kinds are distinct, well-known and readily identifiable species. The remainder are known from such fragmentary collections, vary so from locality to locality, and have been the subject of so much indiscriminate naming that their classification is still in much need of study. A thorough comparative collection, made over a period of years by an enthusiastic scientist afoot in Madagascar, is the only solution to our complete understanding of the evolution of lemurs. It is a challenging opportunity for any naturalist.

Because of their close relationship with man, the lemurs present many especially interesting problems. When any of the questions can be answered by so delightful a pet as Deamer the Lemur, our sometimes tiresome search for facts may become entirely a pleasure.

STRANGE ANIMAL LURES

By JAMES W. ATZ

OF ALL THE MANY ODD WAYS animals catch their prey, none is more intriguing than the predator's use of part of its own body as a lure. Any creature equipped with a "built-in," mobile lure or fishing rod, complete with casting apparatus and bait, would certainly seem worthy of more than casual attention.

As a matter of fact, angler fishes have excited curiosity and wonder since Aristotle's time. The use to which they put the peculiar, fleshy tab, attached to the end of a long, flexible spine located over the mouth, could only be surmised, however, until relatively recently, when the feeding behavior of the European Angler was at last seen and described.[1]

The Angler, *Lophius piscatorius,* inhabits the bottom of the eastern shore of the Atlantic Ocean, sometimes in quite shallow water. A very closely related species, often called the Goosefish, *Lophius americanus,* occurs along the eastern coast of North America. Both species are repulsive-looking fishes with a body that is "all head" and a head that is "all mouth." Behind the wide, flat head, which occupies almost one-half of the total length, the body tapers so sharply to the tail that the fish looks like a gigantic tadpole at first glance. Reaching lengths of four feet, these Anglers have so large a gape that they can, and do, swallow full grown ducks, although it is doubtful if they could make away with a mature goose, as the popular name indicates. Projecting just above the center of the wide mouth is a long, whip-like ray at the end of which is a small tag of flesh which acts as the lure.

Three specimens that lived in the Plymouth Aquarium in England were observed by D. P. Wilson who noted that they erected the spine bearing the lure whenever they were hungry and a suitable fish came anywhere near them. "The lure is quickly jerked to and fro and, as the rod is almost invisible, the bait . . . simulates some tiny creature darting about. An attracted fish rushes up in an endeavor to catch it; the bait is skillfully flicked out of its way just in time and, with a final cast, is dashed down in front of the mouth which may open very slightly. The intended victim, still following the bait, turns slightly head downward; it is now more or less directly head-on to the angler's mouth. The jaws snap faster than the eye can follow and the tail of the prey is next seen disappearing from sight through the firmly closed mouth. As far as I have been able to observe, the bait is not actually touched by the victim before it is caught. . . .

"Besides the quick lashing motion of the lure just described, some anglers occasionally combine

with it another movement. Every now and then the rod is depressed until the bait hangs just in front of and rather below the level of the lower jaw. It is then for a few minutes given a curious vibratory movement, after which the sharp flicking is again resumed, the bait being jerked over wide arcs in various directions."

While cruising on the yacht *Antares* through the West Indies in 1932, Dr. William Beebe captured a fine specimen of the Reddish Frogfish, *Antennarius scaber*, one of the smaller relatives of the angler fishes. "Its lure was, in size, shape, color and movement, a perfect imitation of a wriggling, grayish-white worm. While still on board the *Antares* it devoured three of its own cousins, and a beautiful blue-starred demoiselle. Twice I watched the process, and both times while the prospective prey was at least two inches away, the frogfish opened its mouth and with no

These two pictures show the Reddish Frogfish using its lure to attract a small fish into range of its capacious mouth. In the lower photograph, the minnow has been engulfed; it was swallowed instantly.

apparent effort, created such a maelstrom, such an irresistible current, that the human eye could not see the fish disappear. It simply vanished from sight, the lure was tucked away and we imagined a gleam of satisfaction in the fishy eye."[2]

This specimen was presented to the New York Aquarium, and when it was placed in a tank with some seahorses it promptly ate three of them. So entertaining were its feeding habits that everyone wanted to see it eat. When it finally died, the cause of death was suspected to be indigestion or some associated disorder resulting from overeating. Other species of frogfishes have been observed working their lure to catch fishes, and another distant relative of the Angler, the batfish, has recently been discovered to angle for its dinner.[3] The batfishes' knob-like bait is affixed to a short stem that moves in and out like a plunger, the mechanism being completely hidden when not in use.

Altogether the most bizarre of all the fishes possessing a rod and bait are the deep-sea anglers. These inhabitants of the ocean's lightless depths are usually small, but a few reach lengths of about three and a half feet. Unlike *Lophius* they do not habitually lie on the bottom, doing their fishing instead in mid-water, 1,500 to 15,000 feet below the surface. In these fishes the lure is luminous — as indeed it would have to be in order to operate effectively in total darkness. It has been demonstrated in a number of cases that the light is not produced by the fish itself, but by special bacteria living inside the bait. Biologists call such an intimate living together of two dissimilar organisms, *symbiosis*. Here, both partners benefit from the association, the bacteria getting a home and nourishment while the fish is provided with all-important light.

There is a fantastic variety of styles among the fishing apparatus of deep-sea anglers. Some are short, others are as much as three times as long as the total length of the fish. Some are tipped with simple, bulbous lures, others with weirdly branched or shaped ones, often bearing peculiar tentacles or papillae. So little is known about these fish that it would be most hazardous to try to explain just what is the significance of this great variability.

A quite different type of lure is employed by a Mediterranean species of Star-gazer which makes

a habit of burying itself in the sand so deeply that only its eyes and the upper part of its mouth are exposed. "At times it protrudes from its mouth a little red filament, which represents a membranous process of the valve of the lower jaw. This is made to move about on the sand, crawling, wriggling, contracting and expanding — in short, imitating to perfection the movements of a small worm. There can be little doubt that this

our Photos by Ross Allen

serves as a bait to lure small fry within reach of the concealed jaws of the Star-gazer, and the deception is facilitated by the soft, dusky light of the shallow waters in which it usually operates. Another species from the coast of West Africa uses a broad membranous flap, gleaming white in colour, for the same purpose."[4]

Fishes are not the only creatures that have developed apparatus for attracting prey within range of their jaws; several reptiles have also proved adept at doing so.

The Alligator Snapping Turtle is provided with a worm-like structure lying along the middle of its tongue. This is pink or red in color and stands out prominently against the darker lining of the mouth. This arrangement was first noted by Dr. Raymond L. Ditmars, the late Curator of Reptiles at the New York Zoological Park, and he described how the structure was moved, simulating a squirming worm, while the turtle lay quietly on the bottom with its mouth open.[5] No one has ever seen any animal attracted by this lure, but all agree on its great similarity to a worm and on the apparent use to which the Alligator Snapper puts it. One other turtle, the Matamata of South America, is said to employ movable filaments to attract its prey.

More than forty years ago, Dr. Ditmars noted that when food was introduced into a Reptile House cage containing young Copperheads, the snakes often vigorously wriggled and twisted their bright yellow tails, making them appear for all the world like grubs or maggots. Dr. Ditmars believed it very probable that in these small Copperheads, the tail functions as a lure, and subsequent observations have confirmed his views.[6]

Similar behavior has been noted in the Water Moccasin and the Fer-de-lance, both of which have the tip of the tail colored light yellow when young.[7] In India, Malcolm A. Smith watched the young of *Agkistrodon hypnale,* a relative of the Copperhead and Moccasin, as they waved their tails. Small geckos were so much attracted to these structures that they actually bit them — and were then struck by the snakes and subsequently eaten.

It remained for E. Ross Allen to record this most interesting phenomenon photographically. The receipt of a female Cantil, *Agkistrodon bilineatus,* from Mexico, together with her new-born brood, at his Reptile Institute in Florida, gave him the opportunity to accomplish this. Allen soon noticed that the baby snakes were keeping their tails up in the air and in intermittent motion. These were bright yellow with gray tips, and while they were being moved they resembled "nothing so much as a wriggling worm twisting about hungrily in search of food. To observe the effect of this lure in actual practice," a Green

Tree Frog was placed in the terrarium with the snakes. "When the frog, attracted by the lure, hopped close to one of the baby cantils the snake struck with lightning-like swiftness." The next day Allen introduced four Oak Toads into the terrarium. "The toads were completely enchanted by the provocative lures. In their excitement they hopped over the snakes, completely oblivious of the danger, snapping repeatedly at the tails, especially when the tails were lowered to within reach. However, the snakes made no attempt to kill the toads. Eight days later four tree frogs were placed in with the juvenile cantils. One frog was immediately enticed by one of the tails and bit at it several times. When one of the snakes struck at it, it missed. Two hours later two frogs were caught and eaten. For the next two days, the tails of the snakes that had eaten were kept down, apparently indicating that the tail lure is only utilized by the snake when in quest of prey."[8]

flattened cutwater is to serve as a lure. Small fishes are doubtless attracted toward the surface either by the sight of the black and red beak moving rapidly along or, more probably, by tiny surface circulation which it produces. The skimmer thus baits its own trail and, upon wheeling and returning, it takes advantage of the duped victims which have risen to investigate."

There is a persistent story in South America that the Jaguar uses its tail in fishing.[9] This water-loving cat apparently enjoys fresh fish as much as its domestic relative and catches them in the same way — by scooping them out of the water with a flick of the paw. The Jaguar has been described as luring fish within reach by tapping the surface of the water with its tail, or by draggling its tail in the water. No fully dependable witness has yet reported that he has seen this. Until that time skeptics will shrug their shoulders — as they have at even stranger stories that sometimes turned out to be true!

Ross Allen's photographs on this and the preceding page show young Cantils with their tails in luring position—and the very evident inquisitiveness of an Anolis lizard and an Oak Toad. Apparently the lures are used in a provocative way only when the snakes are hungry.

Among birds and mammals there appear to be few authenticated examples of the employment of parts of the body to lure prey. It has been suggested that some birds have heads or crests resembling flowers and that these serve to attract insects upon which they feed, but these casual observations need confirmation. The Black Skimmer, *Rynchops nigra,* habitually flies close to the surface of the water, just breaking the surface with its bill. Dr. Robert Cushman Murphy has observed these birds "turn and cut the surface of the water again and again in the same area during feeding evolutions," and he has "come to the conclusion that the only practical function of the

1 Gudger, *Amer. Nat.,* 79 (785):542-548, 1945.
2 Beebe, *Bull. N. Y. Zool. Soc.,* 36 (4):97-115, 1933.
3 Breder, *Bull. Amer. Mus. Nat. Hist.,* 94 (2):83-106, 1949.
4 Norman, "A History of Fishes," London, 1947.
5 Pope, "Turtles of the United States and Canada," N. Y., 1939.
6 Neill, *Herpetologica,* 4 (5):161, 1948.
7 Cott, "Adaptive Coloration in Animals," London, 1940.
8 Allen, *Copeia,* (3):225-226, 1949.
9 Gudger, *Jour. Mammalogy,* 27 (1):37-49, 1946.

An Amateur and His Camera In the Zoological Park

Photographs by John Masters

FORTY PHOTOGRAPHS made in the Zoological Park by John Masters, an amateur photographer, are on exhibition in the Heads and Horns Museum Gallery this summer; a selection is reproduced on the next few pages.

Mr. Masters works fast. The "Gayal Family" on this page was literally shot between bites while he was having lunch in the Zoo. A quick grasp of picture possibilities is an invaluable aid to any photographer.

Introducing Mr. Masters' photographs in the Gallery, we said about him and his work:

"Anyone can make good pictures in the Bronx Zoo – anyone who has patience and an interest in good photography.

"Whether you have a box camera or a more expensive apparatus makes little difference. The essential is your imagination.

"John Masters, who made these photographs, is an amateur with skill, patience and imagination. He uses an Auto-Rolleiflex camera with a Xenar f 3.5 lens. He made all these photographs without special privileges or facilities; they show what you, as an amateur, can do, too."

Formosan Doe

ayal Family

rthern Eared Vulture

Nubian Giraffe

Gannet

This is NOT the house in which Mrs. Cordier conducts her housekeeping for the animals in Ecuador—but it is the only photograph of Mrs. Cordier that our animal collector has sent back from South America. The hut is a native home somewhere on the west slope of the Ecuadorean Andes.

Keeping House for Animals in Ecuador

In mid-July Charles and Emy Cordier returned from Ecuador with a magnificent collection of birds and mammals, gathered on the Andean slopes since they sailed form New York last October 2. While in the field, it is Charles' job to roam far and wide and gather the animals; it is Emy's less exciting but equally important task to stay at the base camp — in this case, in Quito — and do the "animal housekeeping" chores. This is her account of her daily routine.

A Letter from EMY CORDIER

Quito, Ecuador
Sunday, June 18

IT IS 12:30 P.M. and I have just finished my tea and sandwich and am starting this letter before someone disturbs me. "Ugly," the pet monkey, is outdoors in her cage, sunning herself and grinding her teeth. She goes through a peculiar teething period. Her teeth were all brown on the edges and seem to grow long fast. She has now worn the brown part off until only little specks are left.

I have been so busy since Charles arrived from the Oriente that I sometimes did not even have time to get a drink of water during a period of three or four hours.

There were two new girls to be trained, as Charles' helper left us after he got up here. It seems this fellow only wanted to stay with us until he could make a plane ride, then he wanted

to go home and boast about it. Also, he had some money saved and that had to be spent!

At 5:00 A.M. the cook-girl comes in and boils 5½ cups of rice. By 6:30 this is dry and cold. The other two girls grind carrots, 24 eggs and 3 pounds of meat, one-half raw and one-half cooked. At 6:30 I open the bird room, the heater is shut off and the sunlamp put on. Then starts the procession from the kitchen – bringing in the food to be mixed by me and the cook. One girl starts washing the feeding dishes and the other changes water. I then serve the 80 birds, among which are four insectivores. The cook in the meantime feeds the monkeys, of which there are eight, also in the bird room. When I am through serving, I go upstairs where the 39 Hummingbirds are and change these from honey-water to the Mellen's food formula with the help of one girl. At a quarter to eight every feather and fur has been fed and we have our breakfast. Two girls after that start cleaning cages. One does the house, and I give all the special care to weak or sick birds. Some are in molt now. Ugly gets cleaned and vitamined, and there are toucanets which want to be petted, a tame jay that likes to have her tidbit. The Umbrella Birds get tonic in their water and there are always some newcomers who need to be hand fed.

At 10:30 A.M. the house girl goes upstairs with me to clean the Hummer cages, for I could not let them take the trays and grates out themselves. The cook goes to the market now and leaves the other girl to finish the cleaning of the 70 cages and the two rooms. The five nocturnal mammals are in a separate room. At 11:30 I add more food everywhere and one girl changes water.

"Lutche," a lovely male marmoset, has lost his "wife" up here (she caught a cold during the nights we were without electricity). He has to be caressed once in a while; he actually cries for it. There are "Pepe and Pepita," the lovely Night Monkeys, tame. They get a raisin once in a while and are trained to be lively in the daytime for exhibit. They have soft fur like Chinchillas. Their faces have dark brown stripes from their big round eyes upwards, and one from the middle of the nose up so that they appear like laughing clowns. They embrace and kiss each other, but when it comes to grab the first raisin Pepe takes Pepita by the forehead fur and pushes her away. In another cage are three black marmosets and one gray dwarf who are constantly swiping food from each other but get along well. They will grab my slacks when I stand nearby but are otherwise shy.

The 8½-foot Boa is put outdoors.

(I am running away from this writing every few minutes to see what goes on in the other house.)

Yesterday morning I gave the cook the key to open the bird room while I was drinking my lemon juice with hot water. I heard all three girls scream and saw them run from the room. I ran to see what happened. There was the Boa across the room, coiled a few times around the water bench, her head close to the door. A pail of water which was on the bench had been spilled all over the floor. (At night I had heard a noise and got up to listen, but I thought it was in the girls' room as they had the light on at that moment.) I got around the snake to look at the cage. The little door on one side was open. We carried the cage, which is too heavy for one alone to lift, with the opening toward the Boa's head. It took a lot of persuading until the cook dared enter to help me. I shoved the frightened beast slowly inside, uncoiling it from the bench. This took a half-hour off our feeding schedule and left the three girls all excited. They are still proud of themselves, for all three finally helped – as the tail was left to push in! The carpenter has now made a better lock to the little door.

At 1:00 P.M. all food is augmented. If there is no special work, the girls get one hour's rest. At 3:00 raisins and plantains are cut up for the 4:00 o'clock food change. If I have to go to the Center for some reason the cook cannot attend to, I must do so between 1:00 and 4:00 P.M., but it always means neglecting some chores which should be done in those hours. If Ugly sees me go out she will yell all during that time, so we are turning her cage around to keep her from seeing me.

Among our five nocturnals is a Cusumbu – Night Monkey, they also call them here. I named her "Lastenia." She is tame. At 6:30 P.M. I let her out in the room to play with me a while. She loves to box and be caressed but will not let me pick her up. She is full grown. I bought her from some local people who left Quito. I get her back into her cage after my supper by giving her a

Over such crude but strong bridges as these Charles Cordier penetrated the Umbrella Bird country on the west side of the Andes, and out of these forests he has brought the Long-wattled form.

piece of candy for which she gladly gets locked up for the night. She is too destructive to be left out. We have three opossums from Quito climate and one from the Oriente, which Charles brought, The one old opossum we caught in our kitchen where we keep our food supplies. She was raiding the egg basket so we knew it was not a rat, of which we have caught eight since we have been here. The carpenter made a trap out of a Trogan cage, and Mrs. Opossum was caught at 10:30 P.M. She seems to have young ones in her pouch but I am not very sure as she is too ferocious to be examined.

Our carpenter is making cages constantly and he also has to be supervised. However, he is a good man, the best we ever had. It is a great relief to Charles.

When Charles comes home from a trip there is a great turmoil until all the birds are placed and used to the different diet we can give them here. Equipment has to be taken apart and sunned and cleaned and reassembled, cages have to be cleaned and overhauled, and Charles is usually up to his ears to answer letters.

At 5:30 P.M. all birds and animals are fed and watered for the evening if there are no interruptions, like visitors or the arrival of new birds.

Ugly then sits with me while I am sipping my sherry and has a blue plastic spoon from which she gets a couple of drops which she adores. The cook then gives me all the expenses to note and I do my posting after supper. At 7:00 P.M. the light is put out in the bird room, Ugly is put into flannel for the night in her box, and so are the

This is part of the great collection of birds that Charles Cordier has brought out of Ecuador — a whole dugout load on the Tiputini River as he was breaking up camp and returning to Quito.

other monkeys. The food of the insectivorous birds is taken out also and the cages of these cleaned and the room locked.

Monday, June 19

One morning as I was still alone with the cook, I felt a bit queer. My heart seemed to labor and I thought of what would happen to all the birds if I should suddenly die. I told Laura, "You had better learn to mix this food so you can take care of the birds if something should suddenly happen to me."

I said, "Supposing you should find me dead in bed one morning, your duty would be to feed the birds first and then wait until the carpenter comes in, then send him to the Consul and he would take care of the rest. But remember that you would have to *answer Mr. Cordier if you lost your head and neglected the animals.*" She was half laughing and half crying, saying that I had better go to see a doctor.

The next morning she came in all excited and said, "Oh Senora, my mother said that if you die the police would lock me up because they would think that I killed you." I told her that was why she should call the Consul first so that this would be avoided.

I must close as there is no more time. Am expecting Charles this week and also a man with more birds. Got 23 from him last week. After this there will be no more time to write.

Sincerely,

Emy Cordier

Now Our Penguins Have A House of Their Own

By LEE S. CRANDALL

WHEN OUR NEW PENGUIN HOUSE was opened on June 15, 1950, as a feature of Members' Day, it marked the culmination of long years of effort. Our first penguins — a pair of Black-foots — came to us from England on July 5, 1905. Their advent was of historical rather than exhibitional value, for aspergillosis, the mold disease that especially besets penguins, quickly had its way.

More experimental importations were made but it was not until 1915 that a pair of Black-foots became so nearly acclimatized that they reared the first young penguin to be bred in North America. That event, however, was by no means the end of our penguin difficulties.

Failures and half successes followed until 1941, when an apparently final solution of the Black-foot problem developed. In that year, a number of vigorous young Black-foots came to us from South Africa.

At the same time, the now famous "Annie" and his Humboldt's Penguin mate were transferred to the Zoological Park from the Aquarium, where they had been exhibited for several years. "Annie" confirmed the suspicion that he had been misnamed by promptly taking his mate to nest. This action must have acted as a "releaser," to use an expression of the behaviorists, for pairs of Black-

President Fairfield Osborn and "Jimmy," an eager little tropical American Kinkajou, together clipped the ribbon and opened the Zoological Park's new Penguin House on June 15. Jimmy has been the official ribbon-cutter for new buildings in the Zoo since he opened the Small Mammal House with great acclaim on our Member's Day in 1947.

This is the way visitors see our penguin collection in its new home. The public space is dimly lighted, in contrast to the fluorescent-lighted compartment for the birds, and the triple-glass panes are free of moisture.

foots promptly followed suit. Since then, twenty-two young Penguins have been reared and the colony has become so resistant that no case of aspergillosis has developed in it during recent years.

While the future of the Black-foot X Humboldt group of penguins in the Zoological Park now seems well assured, the status of those species that live deeper in the antarctic regions has presented a much more difficult problem. Our experiences with the superb King Penguin began in 1926. In that year, four birds were brought from Antarctica by the late Ellis Joseph. The first to reach America alive, these birds thrived during the cool weather of early spring but succumbed, after a few months, to the intense heat of summer. The effects of this depressing result endured until 1947, when we decided to make further efforts to exhibit one of the world's most intriguing birds. In the spring of that year, four Kings brought from South Georgia Island in the South Atlantic, were placed in a shaded section of the Penguin Pool and the water was cooled by floating cakes of ice. The result was the same as that of twenty years before: the birds could not survive high New York City summer temperatures.

Obviously, this left us with two alternatives: we could give up the idea of exhibiting King Penguins or we could provide air-cooled quarters for the summer months. We chose the latter course and early in 1948 began construction of a glorified butchers' cooler, on an experimental basis. The insulated aluminum structure was placed in the Aquatic Bird House extension, out of public access, so that we could be free to operate without regard to appearances. The apparatus was complete by May and two King Penguins that had been obtained in October of 1947 and had wintered well in the outdoor pool, were transferred to it.

Through two summers, our "cooler" proved completely successful and the information gained through its use was incorporated in our new building. In planning the latter, it was thought,

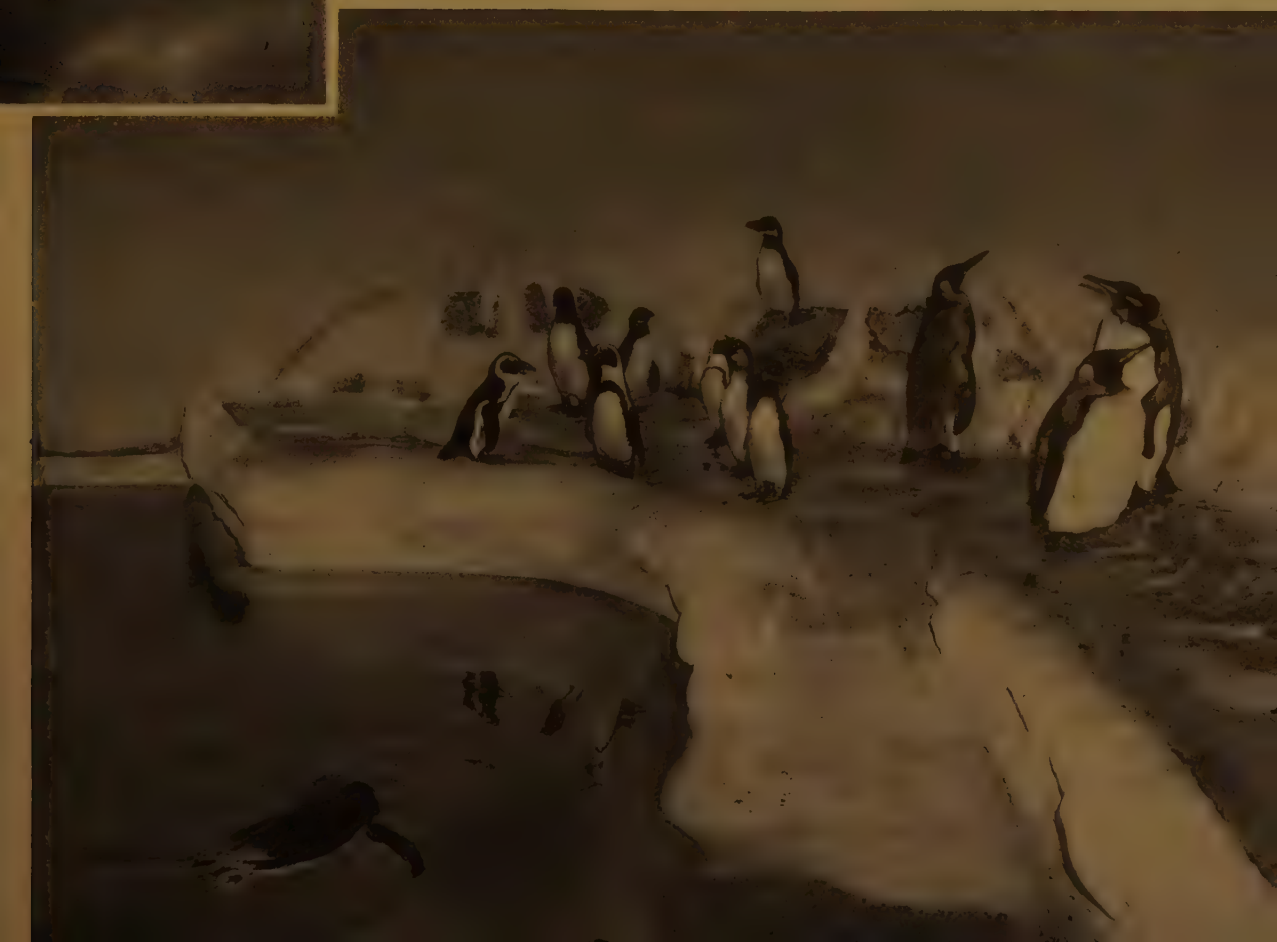
at first, that a section of an existing building might be utilized. However, we later realized that a separate structure, devoted entirely to a penguin exhibit, could become an important addition to our exhibitional units.

The building, located between the Reptile House and the Bear Dens, was designed by Aymar Embury and erected by the Bertoldi-Kelter Company. The total costs, amounting to some $75,000, were paid by the Society from Facilities revenue. Over all, the house measures 45 ft. long by 33 ft. deep. It is divided longitudinally into a two-level public space and a glass-fronted exhibition area. A 24 ft. pool extends along the glass, so that the birds are visible both on and under the water, as well as on the elevated area at the rear. Water pressure is restrained by heavy plate glass inside and condensation from the warm air of the public space is avoided by the use of double-layered, sealed glass on the visitors' side.

The interior of the exhibition area, designed and executed by Albert Wein, the sculptor, represents a bank of polar ice and snow. The water, cleared and purified by an elaborate filtering system, is constantly recirculated. Temperature is maintained at approximately 55° by a cooling system which uses its own water tower. Cool air enters the area through two specially constructed

LEFT — Underwater gyrations of the birds and their astonishing speed and agility have fascinated visitors, who gain a completely new perspective on penguin capabilities.

The chilled interior of the penguin compartment, as seen from the doorway by which the keeper enters to feed the birds. At the right center is a ramp leading down into the water. Some penguins prefer to dive in.



filters, designed to remove bacteria and the spores of molds which might prove fatal if they reached the birds.

Late in May, four King Penguins were placed in these ideal surroundings, our original two having been augmented by a pair secured, in exchange, from the Zoological Gardens in Edinburgh, Scotland, famous for their long-continued success with these birds. In addition were a Gentoo, a bird ordinarily most difficult in captivity and, for variety, six youngsters from our Blackfoot X Humboldt colony, which had just learned to feed for themselves. The birds were obviously

Continued on Page 130

Protecting Penguins from Aspergillosis

By LEONARD J. GOSS

THE AIR IN OUR NEW PENGUIN HOUSE is probably the cleanest air in New York; in fact, there must be few areas in the whole world where the atmosphere is equally or more hygienic.

Are we pampering our penguins?

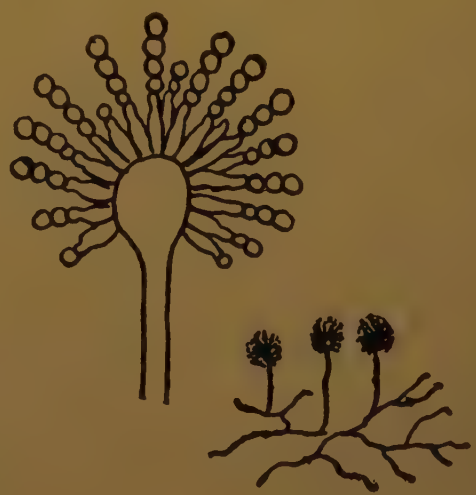
Well, yes and no. If you consider it "pampering" to try to keep them alive and to protect them from disease, yes, we are pampering them. We prefer to feel that it is just good animal management to take advantage of technical apparatus and knowledge that will keep our birds free from aspergillosis.

Aspergillosis is a respiratory disease and it is the greatest scourge of penguins in temperate climates. It is a mold disease of the lungs and air sacs and it is invariably fatal. So common is it among penguins that it is often referred to as "Penguin Disease." Epidemics occur frequently and can wipe out a whole collection of penguins. Other birds are subject to it, to a lesser degree; so, occasionally, is man.

Aspergillus mold reproduces itself by means of minute spores which are carried by the air from moldy food or bedding in the penguins' quarters. Up to now, we know of no treatment and the extremely hardy spores can be killed only by steam sterilization. Experimental work in our Labora-

From "Manual of Plant Diseases" by F. D. Heald

HARMFUL: Aspergillus mold, the killer of penguins, is like this.



From "Manual of Plant Diseases" by F. D. Heald

BENEFICIAL: Penicillium mold from which penicillin is made.

The illustrations above were accidentally transposed. The drawing on the right is Aspergillus mold; the one on the left is Penicillium.

tory demonstrated that aspergillus mold actually throve in test tubes submerged in chemicals that killed other molds.

Since there is no way of curing an infected penguin, the obvious indicated procedure is to prevent infection by filtering the air and making sure that no spores of Aspergillus mold reach the penguins. This required a special filter.

There is, of course, a filter for coarse particles in the air-conditioning unit which maintains the penguin enclosure at an even, low temperature, and it is perfectly adequate to take out dust, dirt and soot. Aspergillus spores, however, might easily sift through such a coarse screen, for they are only 2.5 to 6 microns in diameter. (A micron is 1/25,000th of an inch; a human hair is 1/200th to 1/1,000th of an inch thick).

Our special filters will stop anything larger than ¼ micron — in other words, larger than 1/100,000th of an inch. These filters are made especially for laboratories that require sterile, dust-free and even bacteria-free air. One interesting application of them is in certain laboratories of the Atomic Energy Commission where they filter the smoke from incinerators destroying radio-active material. Eventually the filters themselves become loaded with radio-active particles and have to be destroyed. Since there is no filter-to-filter-the-filters, the AEC simply buries its old filters in concrete vaults. We expect to be able to dispose of our Penguin House filters much more easily, simply by sterilizing them and throwing them away when they become clogged and therefore useless.

News from the Conservation Foundation

The Basic Ground Water Survey Is Completed

COMPLETION of the Survey of Ground Water Resources of the United States in June is a milestone in the history of the Conservation Foundation, since this is the first research project of the organization to be finished and sent to press. During the spring of 1950 Dr. Harold Thomas of the U. S. Geological Survey, in charge of the work, has travelled far afield with his assistant, Stephen Bergen. Many weeks were consumed in preparing the final report for publication.

The McGraw-Hill Publishing Company will issue the survey in book form about the first of next year. News of the survey brought an urgent request for a draft of its findings from the President's Water Resources Policy Commission. A number of other agencies have expressed interest in the survey, among them such organizations as the National Security Resources Board and the U. S. Departments of the Interior and Agriculture.

One most encouraging outcome of this project has been the interest expressed by the National Association of Manufacturers. This association, composed of some 15,000 manufacturers, both large and small and of many industrial types, worked closely with Robert Snider, the Foundation's research chief, and with Dr. Thomas and Mr. Bergen in preparing a questionnaire on industrial water use which has been circulated to the association's entire membership.

Already, some two weeks after the issuance of the questionnaire, more than 2,500 replies have been received, together with requests for about a thousand additional forms, these coming from the larger companies with a number of plants throughout the country. Some N.A.M. members predict that replies will be received from as much as 60 per cent. of the total membership. The request for extra questionnaire forms is especially gratifying, as it indicates serious interest on the part of the bigger units in industry or of the larger water consumers in the United States. Some of these have asked for as many as 100 extra forms.

The information developing from this additional study is expected to be of great value. Data in the field of industrial water consumption have

been quite incomplete. Studies have been made of changes in municipal supply requirements for industrial use, but since there is a vast industrial consumption coming from private sources, the extant information is not at all conclusive.

To compile the results of this subsidiary survey it has been necessary for the Foundation and the National Association of Manufacturers to work with International Business Machines, Inc., in developing a code system for tabulating the returns. We will presumably employ the services of several experts to work up the eventual mass of material that is coming in.

This industrial survey, which has been developed with the help of both private and governmental consultants, deals with both consumption and pollution problems. Its results will eventually be published in some appropriate form, still to be determined.

With the completion of these two jobs in sight, Dr. Thomas has returned to his work in Washington with the Geological Survey.

BEHIND THE SCENES

NEWS AND NOTES OF THE ZOOLOGICAL PARK, THE AQUARIUM AND THE DEPARTMENT OF TROPICAL RESEARCH

"RABBIT-SIZED" FAWN

Visitors who saw our four Chinese Water Deer fawns soon after their birth in June usually reported that they were "no bigger than rabbits," and the accompanying photograph shows that

Chinese Water Deer, Two Days Old

they were indeed scarcely larger than a Cottontail.

Being so tiny, the fawns had no trouble creeping through or under the fence about their big range in the northwest corner of the Zoological Park, and the lower part of the fence had to be entirely guarded with fine-mesh wire for a distance of several hundred yards.

Our Chinese Water Deer came from the Duke of Bedford's herd and arrived in December, 1946. They have the reputation of being delicate in captivity and are unusual in that two to seven young are born at a birth. Our original two pairs have never produced more than twins, but our herd is showing a small increase.

Nearly 200 Electric Eels Arrived Within Three Weeks

By C. W. COATES

As we have reported from time to time, the staff of the Aquarium and its associates are conducting considerable research involving the South American Electric Eel, *Electrophorus electricus*. The work requires a rather large number of these extraordinary creatures and since they have never been bred in captivity it has been necessary to arrange for continuing supplies from Brazil and adjacent areas, the only place in the world where they occur naturally.

There is no commercial fishery for Electric Eels, so the Aquarium has over the years worked out a collecting arrangement with Paramount

Aquarium, Inc., which has the fishing rights for Brazil. Its "Electric Eel Fishery" extends over an enormous section of the Amazon basin, from the island of Marajo in the Amazon estuary to Tabatinga, which is virtually in the Andes. The actual collectors of Electric Eels are Indians and their transportation equipment is of the most primitive kind — balsa wood rafts and dugout canoes. More modern methods take over after the eels are delivered to Paramount Aquarium's representatives up-river, however; the fishery operates a specially-built river boat 300 feet long with a draft of less than three feet, and this craft delivers the shipments of eels to an airplane large enough to carry several tons of water and fish from Brazil to New York.

The mechanical side of the operation has been relatively easy to organize, but it has not always been easy to pursuade, or teach, native collectors to capture such dangerous fish as Electric Eels. A native eel-fishery was operated on a minor scale during the war and produced a steady flow of eels for wartime research, but that collecting system was allowed to lapse at the end of the war. When research on the electrical, physiological and neurological properties of the Electric Eel surged ahead after the war, the native collecting system had to be revived and it has taken several years to get it into full production. For a long time we had to be content with two or three eels every three or four months, or else shipments of valueless baby eels. But now the fishery seems to be in its stride, and between June 13 and early July we received 195 good-sized Electric Eels, and have word from Para that more than a hundred of the creatures are on hand and will be shipped to the Aquarium by the first of August.

Dr. Gordon in Europe to Report on Pigmented Tumors

Dr. Myron Gordon, the Aquarium's geneticist, reported his work on pigmented tumors in fishes before various scientific groups in Europe this summer. In London he addressed the Royal Society of Medicine and from there flew to Istanbul at the invitation of the Zoological Institute of Istanbul to visit the laboratories of Dr. Curt Kosswig, a fish geneticist. At the end of July he was one of three speakers on melanomas before the Fifth International Cancer Congress in Paris and presented a paper on the inheritance of melanomas in fishes.

Record Longevity for a Bird of Paradise

On June 11 our Twelve-wired Bird of Paradise died at the very advanced age of 20 years, 10 months and 9 days. The best previous record for any Bird of Paradise was approximately 17 years for a Lesser in the Amsterdam Zoological Garden.

The longevity record for Birds of Paradise in captivity was established by this Twelve-wired which was in our collection from 1929 to 1950.

Our specimen revealed, on autopsy, a number of conditions associated with senility. The bird was in juvenile plumage when it was received on August 2, 1929.

A Rare Monkey Makes a Good Recovery

Wolf's Monkey from the Belgian Congo is a very rare animal in captivity and two specimens that Charles Cordier brought back last summer were probably the first ever exhibited in the United States. Consequently when one of them got into a fight with a cagemate on April 28 and suffered a bite-fractured leg, Dr. Goss made strenuous efforts to save the animal. Monkeys are by no means the most tractable animal patients, but sometimes splints can be devised that even a monkey cannot pull off. Our veterinarian devised such a splint for the Wolf's Monkey, with the result that two months and one day later, on June 29, it was returned to exhibition with the leg completely healed. The monkey seems to be as active as before the accident.

In appearance, at least, the Wolf's Monkey was most philosophical after his broken leg.

General Curator Crandall At European Meetings

General Curator Crandall attended a series of zoological meetings in Europe between May 31 and June 25. After the sessions of the International Union of Directors of Zoological Gardens in London, he visited Uppsala and took part in the meetings of the International Committee for Bird Protection and the Tenth International Ornithological Congress, later visiting the zoological gardens at Copenhagen and Paris.

A report on European Zoos by Mr. Crandall will be published in a subsequent issue of ANIMAL KINGDOM.

"Pete" the Hippopotamus Is Now Forty-seven Years Old

Once more we are privileged to record the birthday of Peter the Great (better known simply as "Pete"), our aged Hippopotamus. On July 13 Pete was forty-seven years old, having been born in the Central Park Menagerie in 1903. He came to the Zoological Park on July 14, 1906.

Summer Research Fellowships

For the fourth successive year a Summer Research Fellowship in Animal Behavior has been established in the Zoological Park, the incumbent being Joseph Murnin, a graduate student in experimental psychology at Pennsylvania State College. Mr. Murnin is continuing studies begun last summer on the visual acuity of various animals.

Dr. Dallas B. Tuthill, a graduate this spring of the New York State Veterinary College at Cornell University, has been appointed to a Summer Veterinary Research Fellowship, the second that has been granted.

The New Penguin House

Continued from Page 126

delighted with the conditions provided, taking to the water with unexpected spirit and abandon. The pool is so large that even the bulky Kings maneuvered easily, while the smaller birds dashed about with all the agility that penguins are known to possess but seldom exhibit visibly.

Two weeks later, when the doors of the new building were thrown open, the penguins were

well settled and completely at home. One of the Edinburgh Kings chose the moment for an inopportune molt, appearing to increase its girth to such an alarming extent that it had to be banished to the "cooler" until it had returned to normal. But all in all, if well-being of the birds and public acclaim are proper criteria, our new exhibition building appears to be a complete success.

The Duck-billed Platypus Can Climb, Too

By JOHN BLAIR
Keeper of the Platypuses

EARLY THIS SPRING, while our two Duck-billed Platypuses were still in their winter quarters in the basement of the Bird House, I noticed from time to time that tools, brooms, boots and other movable objects left overnight in the Winter Platypusary showed signs of disarray in the morning. Yet the enclosure was perfectly rat-tight and there was no opening that could admit an intruder.

A detailed examination of the burrow-box and swimming tank of the male, Cecil, revealed no possible means of escape. Turning to the female's quarters, I soon found that the box connecting Penelope's burrow and tank had rotted out. I replaced the floor of that box to allow her access to the tank. However this patch-work repair was insufficient and the nightly wanderings continued.

By sanding the floor and the top of her burrow-box, and by sitting motionless and silently outside the enclosure for long hours for several nights, I learned what an agile climber the Duck-billed Platypus really is.

Penelope would appear atop her burrow-box through the two-inch gap between the box and her swimming tank, then cautiously investigate her newly-found liberty. Finally finding her way to the only solid corner she worked her way down the wire screening corners before returning to the well-known safety of her burrow by reversing the route by which she had "escaped."

The most surprising detail, however, was to see her edge her way gingerly around the length and breadth of the three-inch ledge of her swimming tank, gripping the boards to maintain her equilibrium. The first time I witnessed that little antic, I broke into a cold sweat, for a fall of almost four feet to the concrete floor would certainly have been fatal and any slight noise or motion might have startled her into a possible fall. However, I

Penelope made these tracks at night.

interpreted it as just another bit of investigating and waited and watched. Always she made her investigatory trips safely.

Now we are wondering if we should not allow more freedom to the Platypuses, under controlled conditions of course, with a view to an attempt to breed these strange creatures in the United States.

Much observation is still needed, but the end should justify the means. A recent letter from David Fleay, who brought the Platypuses to us in 1947, said there are but four Platypuses in captivity in Australia at present and our Cecil and Penelope are still the only ones outside.

PUBLICATIONS OF INTEREST

THE STORY OF ANIMAL LIFE. By Maurice Burton, Deputy Keeper, Department of Zoology, British Museum (Natural History), with contributions by various other zoologists. 2 vols., pp. i-xii, 1-381; and i-vii, 1-423, 1,200 illustrations from photographs, some in color. Elsevier Publishing Company, Ltd., London, 1949.

To undertake an account of the animal kingdom, from Protozoa to Primates, is a formidable project. In its completion, Dr. Burton has achieved a success of real magnitude.

The first 134 pages of Vol. I are devoted to prepara-

tory subjects under chapter heads relating to various phases of life: origin, mechanism, history, expression, background and "cradle." These are especially well done, many by specialists, so that the reader is fully prepared to make the most of the systematic material that completes this and the second volume. Treatment, in general, is of a popular nature, although technical names are used where required and there is no glossing over of factual matters.

The illustrations are well selected and pleasingly numerous, a matter of great importance in a work of such scope. Moreover, they are largely of recent origin, giving the volumes welcome escape from the risk of slight mustiness which too often threatens general zoological publications.

It probably would be impossible for any author or group to complete a work of this breadth entirely free of statements open to argument and objection. Therefore, it is with some diffidence that this reviewer points out an assertion on page 187 of Vol. II to the effect that Hummingbirds "are found only in South and Central America and the West Indies, although they migrate northwards as far as Canada." Also, a curious confusion, on page 116 of the same volume, concerning the nonexistent egg-carrying pouch of the Platypus.

Such complaints, of course, are of a trivial nature. These volumes over all are an important contribution to the popularization of zoology and as such will be generally welcomed. — L.S.C.

THE SANDHILL CRANES. By Lawrence H. Walkinshaw. x, 1-202. 18 plates from photographs, 1 in color. Bulletin No. 29, Cranbrook Institute of Science, Bloomfield Hills, Michigan.

Fifteen years in time, "some seventy thousand miles of travel," intensive search of the literature and consultation with an impressive list of authorities, have produced an account of the Sandhill Cranes that leaves little to be desired. The four forms of Sandhills — the Lesser, the Greater, the Florida and the Cuban — extend, successively, from Alaska to Cuba and the Isle of Pines. Dr. Walkinshaw has seen, studied and photographed them all in their native haunts.

The subject has been covered in the most comprehensive manner, as the chapter heads suggest: Molts and Plumages, Voice, Crane Behavior, Food and Feeding Habits, Pairing and Territory, Nesting, The Young, The Crane from Fall to Spring and History of North American Crane Populations. The general work is followed by a twelve page list of literature cited, a key to the cranes of the world, a voluminous compendium of distribution records and an extensive index.

This is a timely book, one that may well influence the continuance of the smaller of America's cranes. The Sandhills, at the moment, seem to be holding their own as well as continuous increase of human population will permit. It is perfectly possible that a similar study of the great Whooping Crane, made before it was too late, might have saved that noble bird from its present perilous condition. — Lee S. Crandall.

New Members of the New York Zoological Society

(Between May 1 and June 30)

Life

Master James McDonald Goodell
Henry Ittleson, Jr.
Randolph G. Pack
Mrs. Henry S. Redmond

Contributing

Gilbert Adrian
Dr. Gustave Aufricht
Charles E. Bacon
Hugh B. Baker
S. Hinman Bird
Mrs. I. Townsend Burden, Jr.
Mrs. Henry A. Colgate
Richard Compton
Whitney Darrow
Mrs. Julio de Diego
Lammot duPont
Mrs. A. W. Erickson
Mrs. Florence R. Ferguson
Harry Harkness Flagler
Mrs. Morris Pratt Frost
Mrs. Henry van K. Gillmore
Richard Goldsmith
Eliot P. Hirshberg
Paul P. Huffard
Mrs. James R. Hunt, Jr.
Eric K. Klaussmann
James T. Lee
Russell C. Leffingwell
Mrs. Herbert H. Lehman
Mrs. William DeForest Manice
John Mayer
Frasier W. McCann
Mrs. Dewitt Millhauser
Eugene F. Moran, Jr.
John M. Morehead
Mrs. L. F. Pitman
John T. Pratt, Jr.
Miss Alison Pyne
Lloyd Ramsey
Mrs. James W. Riley
Mrs. David A. Schulte
James Sheldon
Harold Stanley
M. Stein
Mrs. H. Clinch Tate
Hon. Thomas D. Thacher
Louis K. Timolat
Mrs. John Tucker
Mrs. Edward R. Wardwell
William P. Willetts
Mrs. Lucius Wilmerding

Annual

Mrs. Philip E. Allen
Barney N. Apter
Mrs. Lewis Armstrong
Miss E. May Bischoff
Frank T. Buck
Mrs. Charles W. Conlan
Miss A. M. de Groot
Gerald J. Dunphy
Dr. Floyd Fortuin
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Arthur M. Greenhall
Miss Elizabeth H. L. Gurlitz
Mrs. John Hare
Mrs. Thomas B. Hess
Mrs. John A. Hill
Sidney L. Imberman
Bennett A. Johnson
Mrs. Francis L. Kellogg
Walter D. Liebler
Miss Mollie Lifschutz
Fred W. Mall
Jack G. Mauder
A. H. Medjid
Dr. Abelardo Moreno
Edward Morse
Mrs. D. Raymond Noyes
Andreas A. Paloumpis
Miss Frances Poe
Mrs. June Putman
Leonard Rafferty
Diego G. Sada
Raymond M. Schmidt
Mrs. Kenneth C. M. Sills
Frederick J. Stawitz
Mrs. R. E. Strawbridge
Dr. Philip Strax
Dr. Wm. Duncan Strong
Miss S. Walcoff
Mrs. Robert Wolf

We hate to bring it up,

but—

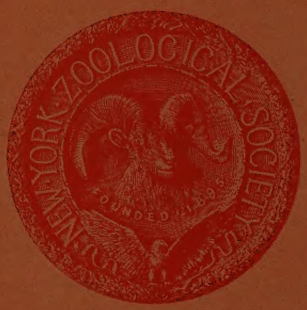
when are you coming back to town?

WE WANT TO MAKE SURE you get certain communications from your Society this fall and so we're starting right now, in mid-vacation time, to remind you to let us know when you change your address from summer to winter residence.

A little later there'll be an announcement of the opening of the new Great Apes House. That's an event you *mustn't* miss. Furthermore, we expect a full-dress report on Charles Cordier's Ecuadorean Expedition, with pictures of many great rarities, in the September-October issue of ANIMAL KINGDOM. We want you to be sure to get that issue.

So, just as soon as you know when you are leaving the mountains, the seashore, the country, or wherever you are for the summer, won't you please drop us a postcard? Just write your name, your after-vacation address, and the date when you'll be there, and send it to:

MEMBERSHIP DEPARTMENT,
The New York Zoological Society,
The Zoological Park,
New York 60, N. Y.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